

Larva and Pupa of *Idiognophomyia enniki* Alexander

(Diptera: Tipulidae)¹

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Idiognophomyia enniki Alexander (1975), the second known nearctic species in its genus, was recently reared from larvae and pupae collected in southern California by Dr. Franklin Ennik. The insects were discovered in decaying Yucca, near U.S. highway 399, about five miles southeast of Ventucopa in western Ventura County, Los Padres National Forest, on 9 April 1974.

Immature forms of *Idiognophomyia* have not heretofore been known from any part of the wide range of the genus. The descriptions below are based upon 17 larvae (of which three are somewhat damaged), 12 intact pupae and 31 cast pupal skins. Most measurements are given as means followed by ranges and are derived from intact specimens only. I am indebted to Dr. Ennik and to Dr. Paul H. Arnaud, Jr., of the California Academy of Sciences, for making these specimens available to me for study.

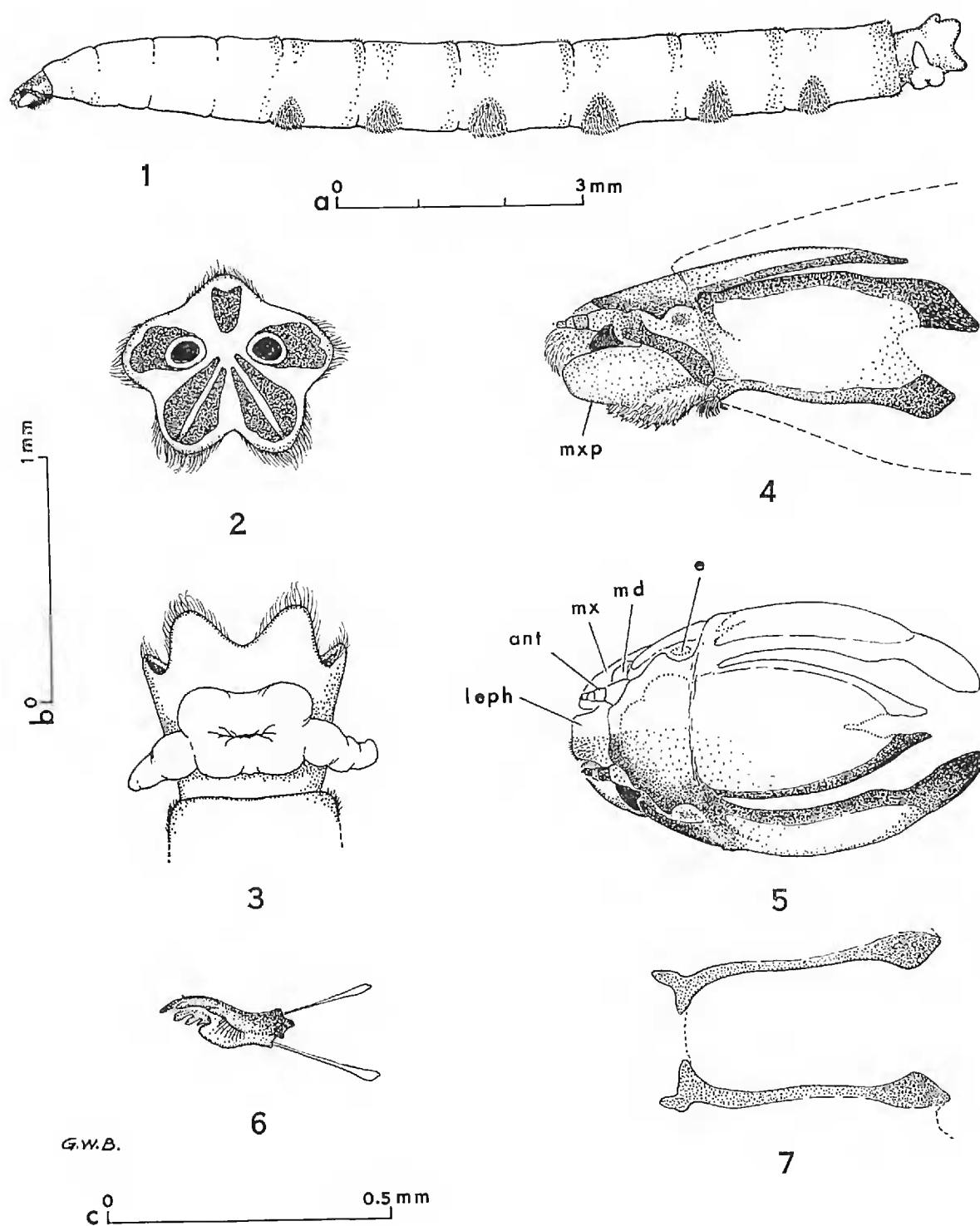
FOURTH INSTAR LARVA

(Figs. 1-7)

Body elongate, subcylindrical (Fig. 1), about 11.5 mm long (10.2-13.0 mm) with head extended, greatest diameter approximately 1.2 mm (1.0-1.3 mm) at fourth abdominal segment, tapering slightly toward either end, dorsoventral diameter slightly greater than transverse diameter throughout. Color generally pale yellowish to light yellowish brown. Integument unevenly covered with minute, appressed yellowish hairs, giving it a silky sheen, hairs longest across posterior dorsum of abdominal segments, particularly seventh; no conspicuous setae. Creeping welts on abdominal segments 2-7 comprising 32 to 36 generally parallel (sometimes interrupted, dividing, or merging), fine, transverse ridges bearing yellowish brown hairs directed caudad.

Spiracular disc (Fig. 2) surrounded by five obtuse but distinct lobes directed backward and outward. Disc marked with densely sclerotized, black spots having granular appearance in reflected light; median dorsal spot truncated to slightly emarginate dorsally; lateral spots in broad contact with spiracles but not surrounding them; ventrolateral spots each divided by pale middle zone except for slender distal connection. Spiracles separated by distance equal to or usually slightly more than their diameter. Peripheral hairs usually bent somewhat cephalad (away from face of disc). Anal gills (Fig. 3) together a subquadrate, whitish structure when

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FIGS. 1-7. Larva of *Idiognophomyia enniki* Alexander. Fig. 1. Entire larva, left lateral aspect. Fig. 2. Spiracular disc, caudal (posterodorsal) aspect. Fig. 3. Terminal abdominal segments, ventral aspect, to show fully everted anal gills. Fig. 4. Head, left lateral aspect; dashed line indicates extent of removed prothorax, mxp—maxillary palp. Fig. 5. Head, dorsal aspect, shaded to indicate degree of sclerotization on lower half only; ant—antenna, e—eye, leph—labrum-epipharynx, md—mandible, mx—maxilla. Fig. 6. Right mandible, mesal aspect, with tendons of abductor and adductor muscles attached. Fig. 7. Ventral bars (darkly sclerotized lower edges) of lateral plates, bordering occipital foramen, ventral aspect, to show partial convergence at anterior ends (at left) but absence of hypostomal bridge. Scale a—Fig. 1; scale b—Figs. 2-3, 7; scale c—Figs. 4-6.

not everted, with short, blunt lobe extending up around each side of eighth abdominal segment when fully everted.

Head roughly oval in dorsal outline (Fig. 5), somewhat depressed (Fig. 4), about 0.78 mm long (0.76–0.80 mm). Posterior incisions deep, extending forward almost to level of attachment of skin (Fig. 5). Dorsal plate (fronto-clypeus) and lateral plates densely sclerotized at margins, only slightly sclerotized centrally, giving appearance of six curved, posteriorly spatulate bars extending backward from attachment of skin into prothoracic segment (Figs. 4, 5). Labrum-epipharynx (leph) a broad lobe covered with yellowish hairs curving forward and downward; clypeus densely sclerotized at anterior margin. Antennae (ant) with two distinct sclerotized segments. Maxillary palp (mxp) large, pale, projecting forward; galea and lacinia represented by dense brushes of yellowish hairs concealing two sclerotized pegs; maxilla hinged along blackened, somewhat curved sclerite before and below eye (e). Mandibles (md) intensely sclerotized at bases, convergent beneath epipharynx, each with six blunt-tipped, flattened teeth, a rounded basal lobe, and linear mesal brush of fine hairs (Fig. 6). Hypostomal bridge (maxillary plate or mentum of some authors) incomplete, the small processes not toothed anteriorly (Fig. 7); a median tuft of dense yellowish hairs spanning gap between hypostomal processes. Hypopharynx supported by a somewhat U-shaped, sclerotized bar and covered anteromedially by densely set yellowish hairs.

PUPA

(Figs. 8–15)

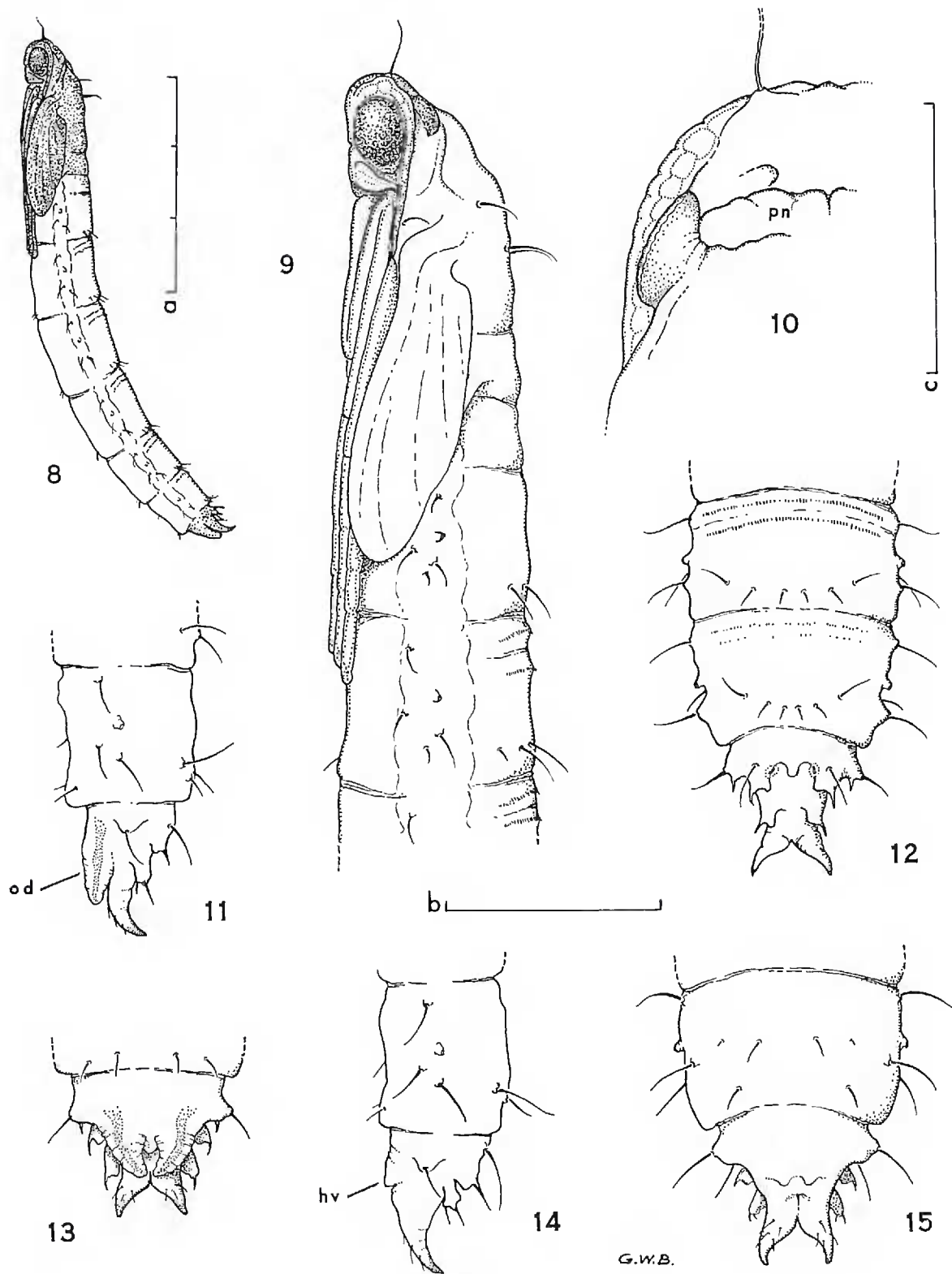
Male pupa approximately 6.5 mm long (6.3–7.0 mm); female about 6.8 mm long (6.4–7.4 mm); curvature of abdomen variable. Most specimens noticeably dorsoventrally flattened, and those not so depressed may have post-mortem distension in preservative. Pupal skin tinged with light brown, nearly transparent. In intact pupae, head and thorax, including wings and legs, progressively darkening with age, from pale brown to nearly black; abdomen similarly darkening to yellowish brown, a little darker on terminal (eighth and ninth) segments.

Head flattened anteriorly, impressed slightly above base of rostrum (Fig. 9). Cephalic crest in form of two broadly rounded ridges separated by a narrow median ridge, extending from above antennal bases on frons over vertex almost to pronotum; a prominent seta on broad, low tubercle on outer slope of each lateral ridge behind antennal scape (Fig. 10). Antennal sheaths extending to femorotibial joints of middle legs, without setae. Labral sheath somewhat prolonged, beak-like, completely separating sheaths of labellar lobes. Sheaths of maxillary palps more than twice as long as greatest width, their tips not recurved.

Thorax 1.0 to 1.2 mm wide, slightly narrower than anterior abdominal segments, depressed, without conspicuous rugosity or spines. Wing sheaths short, extending slightly beyond mid-length of second abdominal segment (Fig. 9), with longitudinal corrugations corresponding to major wing veins (more or less entire venation

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FIGS. 8–15. Pupa of *Idiognophomyia enniki* Alexander. Fig. 8. Entire pupa, left lateral aspect, showing darkening of head, thorax and cauda associated with maturity (i.e., advanced development of pharate adult within). Fig. 9. Anterior



half of pupa, left lateral aspect, showing details of structure and setal distribution. Fig. 10. Detail of portion of head and thorax, dorsal aspect, to show respiratory horn; pn—pronotum. Fig. 11. Terminal abdominal segments of male, left lateral aspect; od—sheath of outer dististyle, with adult outer dististyle visible within. Fig. 12. Terminal abdominal segments of male, dorsal aspect. Fig. 13. Cauda of male, ventral aspect. Fig. 14. Terminal abdominal segments of female, left lateral aspect; hv—sheath of hypovalve of ovipositor. Fig. 15. Terminal abdominal segments of female, ventral aspect. Scales same as for Figs. 1-7: a—Fig. 8, b—Figs. 9, 11-15, c—Fig. 10.

visible in mature pupae in properly reflected light). Leg sheaths reaching beyond second abdominal segment, in some individuals as far as mid-length of third segment. Pronotum a narrow, irregularly shaped transverse band before respiratory horns. Mesonotum deeply impressed at each side between respiratory horn and mid-length of segment, impression bordered laterally by a sinuate ridge from above respiratory horn to near wing base (Fig. 9). Metanotum short, with bases of haltere sheaths barely exposed. On each side of mesonotum, a large seta before and below wing base near antennal sheath, another above and before wing base, and a pair from contiguous sockets above wing base (Fig. 9). Mesonotal respiratory horns in lateral aspect oblong, broadly attached along one edge, in dorsal aspect somewhat ear-like in form (Fig. 10), perforated along outermost edge. Two or three small setae in groove between respiratory horn and antennal sheath. Surface of anterior mesonotum uneven, with slight rugosity at either side of mid-line; posterior mesonotum nearly smooth, with minute, faint transverse striations.

Abdomen comprising short first segment, six longer segments generally similar to one another, and two short, highly modified caudal segments (Fig. 8). Segment 1 without setae; segment 2 with four pleural setae and two on each side near posterior margin; segments 3-6 with three posterior tergal setae at each side, 4 setae along posterior edge of sternum and 4 (outer pair very small) near mid-length of sternum, and with pleural setae arranged approximately as on segment 2. Terga 3-6 bearing on anterior half two transverse ridges set with irregularly interrupted rows of small but stout setae (Figs. 9, 12). Setal distribution on segment 7 somewhat reduced from pattern of segments 3-6. Spiracles on subconical papillae on pleura of segments 2-7. Ninth segment of both sexes terminating in pair of divergent, upturned, conical horns (Figs. 11-15). Eighth and ninth segments in dorsal aspect similar in males and females (Fig. 12), with remnants of larval spiracles evident externally at intersegmental fold. Male cauda characterized by thick, wrinkled, incurved sheaths of outer dististyles (od) beneath terminal horns (Figs. 11, 13). Female cauda bearing two small ventral lobes, sheaths of hypovalves of eighth sternum (Figs. 14, 15, hv).

DISCUSSION

Idiognophomyia was originally recognized (Alexander, 1956: 403) as a subgenus of *Gnophomyia*, differing from the rest of that genus in having conspicuous scales on the legs, a greatly reduced ovipositor, and a distinctive male hypopygium. It is accordingly of some interest to see whether generic status of the group, based on these adult characters, is supported by structures of the larva and pupa. Comparison of *Idiognophomyia* and *Gnophomyia* is difficult, however, since immature forms of few *Gnophomyias* are known, with the result that the distinction between specific and generic characters is not yet clear.

The larva of *Idiognophomyia enniki* is not conspicuously different from that of described species of *Gnophomyia*, and by existing keys (e.g., Alexander, 1920; Brindle, 1967) it runs directly to *Gnophomyia*. Even when the immature forms of a species of *Gnophomyia* have been described and illustrated in detail (e.g., Rogers, 1927, 1928), there

seems to be no character that obviously sets the two genera apart. That is, while the larvae of *Idiognophomyia* clearly resemble those described in *Gnophomyia*, they are not particularly like larvae of any other genus of subtribe Gonomyaria (*Gonomyia*, *Teucholabis*, *Rhabdomastix*, or *Lipsothrix*). Similarly, the pupa of *Idiognophomyia enniki* most closely resembles described pupae of species of *Gnophomyia* with respect to such taxonomic characters as mesonotal armature and respiratory horns, cephalic crest, distribution of setae and structure of caudal segments (except that the cercal sheaths, conspicuously long in female pupae of *Gnophomyia*, are short in *Idiognophomyia*). It is again not particularly like the pupa of any other genus of Gonomyaria. There being no evidence to the contrary, I take these similarities to imply a closer evolutionary relationship of *Idiognophomyia* to *Gnophomyia* than either has to any other genus in their subtribe. What this means in terms of taxonomy, however, is moot. *Idiognophomyia* could be returned to subgeneric status under *Gnophomyia*, or because of the distinctive adult characters the two groups could continue to be recognized as closely related genera of the Gonomyaria. I see no particular objection to the latter alternative.

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